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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,025	06/21/2002	Anthony Hooley	KEM1.N.80540B	9464

3775 7590 06/18/2008

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EXAMINER	
KURR, JASON RICHARD	
ART UNIT	**PAPER NUMBER**
2615	
MAIL DATE	**DELIVERY MODE**
06/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/089,025	HOOLEY ET AL.	
	Examiner	Art Unit	
	JASON R. KURR	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *224-242* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *224-242* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/20/08 5/16/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 16, 2008 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 224-242 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greenberger (US 5,870,484) in view of Gorike (US 4,256,922).

With respect to claim 224, Greenberger discloses a method of causing plural input signals (fig.13a “L,R”) representing respective channels to appear to emanate from respective different positions in space (col.3 ln.31-55), said method comprising: providing a sound reflective or resonant surface at each of said positions in space

(fig.8a-d); providing an array of output transducers distal from positions in space (fig.13a "Not Labeled"); directing, using said array of output transducers, sound waves of each channel towards the respective position in space to cause said sound waves to be retransmitted by said reflective or resonant surface (col.3 ln.31-55); said step of directing comprising: obtaining, in respect of each transducer, a delayed replica of each input signal delayed by a respective delay (fig.13a "Delay") selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that channel (col.11 ln.16-67, col.12 ln.1-2); summing, in respect of each transducer, the respective delayed replicas of each input signal to produce an output signal (fig.13a "sum"); and routing the output signals to the respective transducers (fig.13a).

Greenberger does not disclose expressly wherein the replicas for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space.

Gorike discloses a stereophonic speaker system wherein an array of output transducers (fig.3 #24-26) causes a plurality of input signals to appear to emanate from respective different positions in space such that signals for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space (see Abstract, col.2 ln.18-36). At the time of the invention it would have been obvious to use the directive sound delay methods of Gorike in place of the signal inversion delay methods Greenberger in order to control the spatial sound

reproduction. The motivation for doing so would have been to maximize the auditory panorama of a space too small to achieve natural spatial delays emitted from the loudspeakers as taught by Gorike (col.2 ln.18-36).

With respect to claim 225, Greenberger discloses a method according to claim 224, wherein said step of obtaining, in respect of each output transducer, a delayed replica of the input signal comprises: replicating said input signal to obtain a replica signal in respect of each output transducer (col.30 ln.35-39); delaying each replica of said input signal by said respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space (fig.13a "delay", col.57 ln.60-67, col.58 ln.1-54).

With respect to claim 226, Greenberger discloses a method according to claim 224 further comprising: calculating, before said delaying step, the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.58 ln.39-54).

With respect to claim 227, Greenberger discloses a method according to claim 224 further comprising: inverting one of said plural input signals; obtaining, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer, so that sound waves derived from said inverted input signal are directed at

a position in space so as to cancel out at least partially sound waves derived from that input signal at that position in space (col.2 ln.36-54).

With respect to claim 228, Greenberger discloses a method according to claim 227, wherein said step of obtaining, in respect of each output transducer, a delayed replica of said inverted input signal comprises: replicating said inverted input signal to obtain a replica signal in respect of each output transducer (col.30 ln.35-39); delaying each replica of said inverted input signal by a respective predetermined delay selected in accordance with the position in the array of the respective output transducer (col.57 ln.60-67, col.58 ln.1-54).

With respect to claim 229, Greenberger discloses a method according to claim 227, wherein said inverted input signal is scaled so that the sound waves derived from said inverted input signal cancel sound waves derived from that input signal at said position in space (col.11 ln.19-37, col.14 ln.19-36).

With respect to claim 230, Greenberger discloses a method according to claim 229, wherein said scaling is selected by determining, in respect of the input signal which has been inverted, the magnitude of sound waves at said position in space and selecting said scaling so that sound waves derived from said inverted input signal have the same magnitude at that position (col.58 ln.1-4).

With respect to claim 231, Greenberger discloses a method according to claim 224, wherein at least one of said surfaces is provided by a wall of a room or other permanent structure (col.77 ln.42-60).

With respect to claim 232, Greenberger discloses an apparatus for causing plural input signals (fig.13a "L,R") representing respective channels to appear to emanate from respective different positions in space (col.3 ln.31-55), said apparatus comprising: a sound reflective or resonant surface at each of said positions in space (fig.8a-d); an array of output transducers distal from said positions in space (fig.13a "Not Labeled"); and a controller (fig.13a "Delay Spatial Control", "Level Spatial Control") for directing, using said array of output transducers, sound waves of each channel towards that channel's respective position in space such that said sound waves are re-transmitted by said reflective or resonant surface; said controller comprising replication (col.30 ln.35-39) and delay means (fig.13a "Delay") arranged to obtain, in respect of each transducer, a delayed replica of the input signal delayed by a respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that input signal (col.57 ln.60-67, col.58 ln.1-54); adder means arranged to sum (fig.13a "sum"), in respect of each transducer, the respective delayed replicas of each input signal to produce an output signal; and means to route the output signals to the respective transducers such that the channel sound waves are directed towards the position in space in respect of that input signal (fig.13a).

Greenberger does not disclose expressly wherein the replicas for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space.

Gorike discloses a stereophonic speaker system wherein an array of output transducers (fig.3 #24-26) causes a plurality of input signals to appear to emanate from respective different positions in space such that signals for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space (see Abstract, col.2 ln.18-36). At the time of the invention it would have been obvious to use the directive sound delay methods of Gorike in place of the signal inversion delay methods Greenberger in order to control the spatial sound reproduction. The motivation for doing so would have been to maximize the auditory panorama of a space too small to achieve natural spatial delays emitted from the loudspeakers as taught by Gorike (col.2 ln.18-36).

With respect to claim 233, Greenberger discloses an apparatus according to claim 232, wherein said controller further comprises: calculation means for calculating the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.58 ln.39-54).

With respect to claim 234, Greenberger discloses an apparatus according to claim 232, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication and delay means (fig.13a “Delay”) arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that sound waves

derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said second position in space (col.2 ln.36-54). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk canceller of Greenberger.

With respect to claim 235, Greenberger discloses an apparatus according to claim 234, wherein said controller further comprises a scaler (fig.13a "Level Spatial Control") for scaling said inverted input signal so that the sound waves derived from said inverted input signal substantially cancel sound waves derived from that input signal at said second position in space (col.58 ln.1-4).

With respect to claim 236, Greenberger discloses an apparatus according to claim 232, wherein said surfaces are reflective and have a roughness on the scale of a wavelength of sound frequency it is desired to diffusely reflect (fig.8a-d).

With respect to claim 237, Greenberger discloses an apparatus according to claim 232, however does not disclose expressly wherein said surfaces are optically-transparent.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to include optically transparent windows in the walls of Greenberger.

The motivation for doing so would have been to allow a user to visibly see into an opposing room or to view the environment outside of the room.

With respect to claim 238, Greenberger discloses an apparatus according claim 233, wherein at least one of said surfaces is a wall of a room or other permanent structure (col.77 ln.42-60).

With respect to claim 239, Greenberger discloses an apparatus for causing plural input signals (fig.13a “R,L”) representing respective channels to appear to emanate from respective different positions in space (col.3 ln.31-55), said apparatus comprising: an array of output transducers distal from said positions in space (fig.13a “Not Labeled”); and a controller (fig.13a “Delay Spatial Control”, “Level Spatial Control”) for directing, using said array of output transducers, sound waves of each channel towards that channel's respective position in space such that said sound waves are retransmitted by said reflective or resonant surface (col.3 ln.31-55); said controller comprising: replication (col.30 ln.35-39) and delay means (fig.13a “Delay”) arranged to obtain, in respect of each transducer, a delayed replica of the input signal delayed by a respective delay selected in accordance with the position in the array of the respective output transducer and said respective position in space such that the sound waves of the channel are directed towards the position in space in respect of that input signal (col.57 ln.60-67, co.58 ln.1-54); adder means arranged to sum (fig.13a “sum”), in respect of each transducer, the respective delayed replicas of each input signal to produce an output signal; and means to route the output signals to the respective transducers such that the channel sound waves are directed towards the position in space in respect of that input signal (fig.13a).

Greenberger does not disclose expressly wherein the replicas for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space.

Gorike discloses a stereophonic speaker system wherein an array of output transducers (fig.3 #24-26) causes a plurality of input signals to appear to emanate from respective different positions in space such that signals for transducers closer to the respective position in space are delayed more than replicas for transducers further from the position in space (see Abstract, col.2 ln.18-36). At the time of the invention it would have been obvious to use the directive sound delay methods of Gorike in place of the signal inversion delay methods Greenberger in order to control the spatial sound reproduction. The motivation for doing so would have been to maximize the auditory panorama of a space too small to achieve natural spatial delays emitted from the loudspeakers as taught by Gorike (col.2 ln.18-36).

With respect to claim 240, Greenberger discloses an apparatus according to claim 239, wherein said controller further comprises: calculation means for calculating the respective delays in respect of each input signal replica by: determining the distance between each output transducer and the position in space in respect of that input signal; deriving respective delay values such that the sound waves from each transducer for a single channel arrive at said position in space simultaneously (col.58 ln.39-54).

With respect to claim 241, Greenberger discloses an apparatus according to claim 239, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication (col.30 ln.35-39) and delay means (fig.13a "Delay") arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that

sound waves derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said second position in space (col.2 ln.36-54). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk cancellation disclosed by Greenberger.

With respect to claim 242, Greenberger discloses an apparatus according to claim 241, wherein said controller further comprises: an inverter for inverting one of said plural input signals; second replication (col.30 ln.35-39) and delay means (fig.13a "Delay") arranged to obtain, in respect of each output transducer, a delayed replica of said inverted input signal delayed by a respective delay selected in accordance with the position in the array of the respective transducer and a second position in space so that sound waves derived from said inverted input signal are directed at said second position in space so as to cancel out at least partially sound waves derived from that input signal at said second position in space (col.2 ln.36-54). It is inherent that an inverter can be used to achieve a phase-inverted signal as does the cross talk cancellation disclosed by Greenberger.

Response to Arguments

Applicant's arguments, see "Remarks" pages 8-11, filed May 16, 2008, with respect to the rejection(s) of claim(s) 224, 232 and 239 under Greenberger (US 5,870,484) have been fully considered and are persuasive. Therefore, the rejection has

been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Gorike (US 4,256,922).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON R. KURR whose telephone number is (571)272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jason R Kurr/
Examiner, Art Unit 2615

/Vivian Chin/
Supervisory Patent Examiner, Art Unit 2615